

Aaron David Lamplugh, PhD
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EDUCATION

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| University of Colorado Boulder
PhD, Mechanical Engineering <ul style="list-style-type: none">Air Quality Focus | AUG 2015 - AUG 2019
GPA: 3.80/4.00 |
| University of Colorado Boulder
MS, Mechanical Engineering <ul style="list-style-type: none">Air Quality Focus | AUG 2015 - MAY 2017
GPA: 3.81/4.00 |
| University of Alabama at Birmingham (UAB)
Bachelor of Science with Honors, Mechanical Engineering <ul style="list-style-type: none">University Honors - Global and Community Leadership Honors ProgramDepartmental Honors - Department of Mechanical EngineeringMagna Cum Laude | AUG 2008 - MAY 2012
GPA: 3.75/4.00 |

RESEARCH EXPERIENCE

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| <i>The University of Colorado Boulder/NOAA</i>
<i>Cooperative Institute for Research in Environmental Sciences (CIRES)</i>
<i>NOAA ESRL Chemical Sciences Laboratory</i> | Boulder, CO
MAR 2020 – Present |
|---|-----------------------------------|
- Principal Investigator: Jessica Gilman, PhD
 - Research project: COVID-AQS
 - Research goals: Monitor the atmospheric impact of COVID-19, assess changes in emission sources, and characterize the effects of changes on air quality.
 - Project description: The National Oceanic and Atmospheric Administration (NOAA) COVID - Air Quality Study (COVID-AQS) was designed to be a rapid response study aimed at monitoring air-quality impacts from COVID-19. Detailed volatile organic compound (VOC) measurements were captured using the NOAA Gas Chromatograph-Mass Spectrometer (GC-MS), and were supported by a full suite of atmospheric measurements including high-time-resolution VOCs, NO_x, CO, CO₂, H₂O CH₄, particulate matter (PM), and meteorology. I was responsible for performing VOC measurements using the NOAA GC-MS and performing analyses to compare measurements from 2020 COVID-AQS to previous measurements taken at the same location during spring and

summer 2018. I also performed GC-MS analysis on airborne canister samples collected over New York City by researchers at the University of Maryland.

- Role: Research Scientist/Instrument PI

The University of Colorado Boulder/NOAA

Cooperative Institute for Research in Environmental Sciences (CIRES)

NOAA ESRL Chemical Sciences Laboratory

Boulder, CO

MAY 2019 – Present

- Principal Investigator: Jessica Gilman, PhD
- Research project: FIREX-AQ
- Research goals: Characterize biomass burning emissions from wildfires and agricultural fires in the United States, update relevant emission inventories, and investigate environmental and health impacts.
- Project description: This project was jointly organized by the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) and used airborne measurements, satellite data, and numerical models to characterize emissions from biomass burning in the United States. As a principal investigator (PI) on the NOAA Gas Chromatograph-Mass Spectrometer (GC-MS), I was responsible for collecting detailed chemical measurements of volatile organic compounds (VOCs) onboard the NASA DC-8 Airborne Science Laboratory. I also performed subsequent analysis to compare VOC measurements from other instruments onboard the NASA DC-8, and characterize VOC emission variability from fires sampled during FIREX-AQ.
- Role: Research Scientist/Instrument PI

The University of Colorado Boulder

Department of Civil, Environmental, and Architectural Engineering

Boulder, CO

JUNE 2016 - MAY 2019

- Principal Investigator: Lupita Montoya, PhD
- Research goal: Assess volatile organic compound (VOC) exposure among nail salon workers and evaluate the VOC removal capability of low-cost sorbent materials for use in the indoor environment.
- Project description: Nail salon workers face chronic exposure to VOCs, which can adversely impact human health. This project focused on quantifying VOC exposure among nail salon technicians and developing and evaluating adsorption-based technology aimed at reducing this exposure. As the graduate researcher in charge of this project, I conducted field and laboratory measurements of VOCs, innovated new air-cleaning technology, secured project funding, authored original peer-reviewed research articles, presented original research to the scientific community, and mentored undergraduate research assistants involved in the work.
- Role: Graduate Research Assistant/PhD Candidate

The John A. Volpe National Transportation Systems Center
United States Department of Transportation
Office of the Assistant Secretary for Research and Technology

Cambridge, MA
MAR 2014 - JULY 2015

- Program Manager: Marco daSilva
- Research goal: Determine the effect of grade separation on pedestrian trespass activity within the railroad right-of-way (funded by FRA Office of Research and Development)
- Role: Project Manager, Mechanical Engineer

The John A. Volpe National Transportation Systems Center
United States Department of Transportation
Office of the Assistant Secretary for Research and Technology

Cambridge, MA
MAY 2013 - FEB 2014

- Program Manager: Marco daSilva
- Research goal: Determine the effect of LED enhanced warning signs on vehicle speeds at highway-railroad intersections (funded by FRA Office of Research and Development)
- Role: Mechanical Engineer

Caprock Integrity Laboratory
The University of Alabama at Birmingham

Birmingham, AL
SEPT 2009 - MAY 2012

- Mentor: Peter Walsh, PhD
- Research goal: Determine the storage capacity of stratified sedimentary layers for use in geologic carbon sequestration
- Role: Undergraduate Research Assistant

Materials Reliability Laboratory
The National Institute of Standards and Technology

Boulder, CO
MAY 2011 - AUG 2011

- Mentor: Nicholas Barbosa, PhD
- Research goal: Develop a process for the creation of micro material samples with bulk material properties
- Role: Summer Intern

PUBLICATIONS

Lamplugh, A., Coggon, M.M., Gkatzelis, G., Peischl, J., Aiken, K., Rollins, D., Warneke, C., Brown, S., Gilman, J.B. *TBD*. Changes in Volatile Organic Compounds due to COVID-19 related activity: Results from the COVID-AQS study in Boulder, CO. *In Prep*.

Lamplugh, A., M., Nguyen, A., Montoya, L.D., 2020. Optimization of VOC Removal Using Novel, Low-Cost Sorbent Sinks and Active Flows. *Building and Environment*. 176, 106784.

Lamplugh, A., Harries, M., Nguyen, A., Montoya, L.D., 2020. VOC Emissions from Nail Salon Products and Their Effective Removal Using Affordable Adsorbents and Synthetic Jets. *Building and Environment*. 168, 106499.

Lamplugh, A., Harries, M., Xiang, F., Trinh, J., Hecobian, A., Montoya, L.D., 2019. Occupational Exposure to Volatile Organic Compounds and Health Risks in Colorado Nail Salons. *Environmental Pollution*. 249, 518–526.

Hellman, A., **Lamplugh, A.**, 2016. Evaluation of LED sign technology at a passive highway-rail grade crossing. U.S Department of Transportation, Federal Railroad Administration. Washington, D.C. <https://rosap.ntl.bts.gov/view/dot/12279>.

Walsh, P.M., Esposito, R.A., Theodorou, K., Hannon, M.J. Jr., **Lamplugh, A.**, Ellison, K.M., 2013. Recovery Act: Geologic Sequestration Training and Research. U.S. Department of Energy, National Energy Technology Laboratory. Oak Ridge, TN. <https://www.osti.gov/servlets/purl/1116015>.

CONFERENCE PROCEEDINGS/PRESENTATIONS

A. Lamplugh, V. Selimovic, M. Coggon, G. Gkatzelis, K. Sekimoto, C. Warneke, D.R. Blake, B. Barletta, B. Biggs, N.J. Blake, A. Hoffman, A. Jarrot, S. Meinardi, I.J. Simpson, C. Woods, E. Apel, R. Hornbrook, A. Hills, G.S. Diskin, C. Holmes, P.T. Bui, J.B. Gilman. University of Colorado Boulder. “An Intercomparison of FIREX-AQ VOC Instruments Onboard the NASA DC-8” Presentation at NASA/NOAA FIREX-AQ meeting 2020 (Virtual Presentation).

A. Lamplugh, L. Montoya. University of Colorado Boulder. “Volatile Organic Compound Exposure in Colorado Nail Salons.” Poster Presentation at ISES-ISEE 2018 (Ottawa, ON, CA).

A. Lamplugh, L. Montoya. University of Colorado Boulder. “Volatile Organic Compound Exposure in Colorado Nail Salons.” Poster Presentation at Indoor Air 2018 (Philadelphia, PA).

A. Lamplugh, Feng Xiang, Janice Trinh, L. Montoya. University of Colorado Boulder. “A Pilot Study of VOC Exposure in Front Range Nail Salons.” Poster Presentation at 2018 MAP ERC Annual Research Day Symposium (Westminster, CO).

A. Lamplugh, Feng Xiang, Janice Trinh, Elizabeth Ly, L. Montoya. University of Colorado Boulder. “Investigation of VOC Exposure from Nail Salon Products.” Platform Presentation at 2017 American Association for Aerosol Research Annual Conference (Raleigh, NC).

A. Lamplugh and L. Montoya. University of Colorado. "Evaluation of Low-Cost Materials for VOC Removal in Nail Salons." Poster Presentation at 2017 MAP ERC Annual Research Day Symposium (Westminster, CO).

A. Lamplugh, S. Ravichandran, S. Miller, L. Montoya. University of Colorado Boulder. "Evaluation of Low-Cost Materials for VOC Removal in Nail Salons." Platform Presentation at 2016 American Association for Aerosol Research Annual Conference (Portland, OR).

A. Hellman and **A. Lamplugh**. U.S Department of Transportation, Federal Railroad Administration. "Preliminary Analysis of LED Enhanced Signs at a Passive Rural Level Crossing." Proceedings of the 2015 Joint Rail Conference (San Jose, CA).

A. Hellman and **A. Lamplugh**. U.S Department of Transportation, Federal Railroad Administration. "Preliminary Analysis of LED Enhanced Signs at a Passive Rural Level Crossing." Proceedings of the 2014 Global Level Crossing Symposium (Urbana, IL).

WORK EXPERIENCE

The John A. Volpe National Transportation Systems Center

Cambridge, MA

Mechanical Engineer

MAY 2013 - JULY 2015

- Task manager for human factors study concerning grade separation of highway-railroad intersections
- Provided support and analyzed data for transportation safety studies evaluating innovative rail technology
- Authored/Edited documents related to new applications of connected vehicle technology
- Created emergency egress models/simulations for passenger rail cars
- Installed weather/visibility sensors for aviation studies
- Installed low-visibility aviation systems for data collection and evaluation

Jefferson County Department of Health (JCDH)

Birmingham, AL

Air Pollution Intern

SEPT 2010 - DEC 2010

- Participated in Air Pollution monitoring site visits
- Observed air quality measurements taken from sensors around Jefferson County, Alabama
- Attended visible emission certification course/examination

Teledyne Continental Motors

Mobile, AL

Manufacturing Engineering Intern

MAY 2010 - AUG 2010

- Created process planning for the manufacture of aircraft engine crankcases
- Interpreted CNC code from engineering drawings
- Assisted in the implementation of a new production line for light 4-Cylinder engine crankcases
- Oversaw the manufacture of crankcases for major customers such as Cessna
- Created work stations for new manufacturing operations

AWARDS AND HONORS

CU Boulder NEST Summer Graduate Fellowship Awarded: MAY 2018

- \$5,000 summer funding for cross-disciplinary research
- Awarded based on proposal for cross-disciplinary art/science research project
- 1 of 3 projects to receive full funding for summer 2018

CU Engage Community-Based Research Fellowship Awarded: AUG 2017

- Partial funding and stipend for 2017-2018 year
- Awarded to 5 graduate students from CU Boulder
- Awarded to students engaged in community-based research projects, based on proposals

NSF GK-12 Teaching Fellowship Awarded: JUN 2016

- Full funding and stipend for 2016-2017 year
- Awarded to 6 graduate students from CU Boulder
- Provides STEM teaching experience in K-12 classrooms

University of Colorado Boulder Awarded: MAR 2015

- Dean's Outstanding Merit Fellowship
- Outstanding Mechanical Engineering Research Potential Fellowship

Assistant Secretary of Transportation for Research and Tech Team Award Awarded: FEB 2015

US Department of Transportation

- Awarded to the Enhanced Low Visibility Operations Research Team

Secretary of Transportation Team Award Awarded: DEC 2013

US Department of Transportation

- Awarded to the Grade Crossing Safety and Trespass Prevention Research Team

Department of Homeland Security - STEM Scholarship Program Awarded: JULY 2010

US Department of Homeland Security

- Awarded to approximately 30 undergraduate students nationwide
- Included a two-year, full tuition scholarship, a monthly stipend, and a summer internship (performed at NIST Boulder)

University of Alabama at Birmingham - Full Tuition Scholarship

Awarded: AUG 2008

- Awarded to entering freshmen with a minimum 3.3 GPA and 29-ACT
- Full tuition and fees for four years
- Two thousand dollar per year housing allowance

Phi Kappa Phi Honors Society Member

Tau Beta Pi Honors Society Member

Pi Tau Sigma Honors Society Member

UAB Dean's List: Fall 2008, Fall 2009, Spring 2010, Fall 2010, and Spring 2011

UAB Presidential Honors List: Spring 2009 and Fall 2011

RESEARCH PROJECTS

Agency: CU Boulder - Nature, Environment, Science & Technology (NEST) Studio for the Arts

Air-Cleaning Ceramic Artwork for Volatile Organic Compound Removal in Nail Salons

Period of Performance: May 2018 - August 2018

Funding-to-date: \$11,000

Role: Graduate Researcher/PI

Agency: Mountain & Plains Education and Research Center

Evaluation of low-cost materials for VOC removal in nail salons

Period of Performance: July 2016 - Present

Funding-to-date: \$15,000

Role: Graduate Researcher

Agency: US Department of Transportation, Federal Railroad Administration

An evaluation of grade separation on pedestrian trespass activity

Period of Performance: February 2014 - July 2015

Funding-to-date: \$100,000

Role: Project Manager and Research Engineer

Agency: US Department of Transportation, Federal Railroad Administration

An evaluation of pedestrian gate skirts at highway-rail intersections

Period of Performance: July 2013 - July 2015

Funding-to-date: \$100,000

Role: Research Engineer

Agency: US Department of Transportation, Federal Railroad Administration
An evaluation of LED sign technology at a passive highway-rail grade crossing
Period of Performance: N/A
Total Funding: \$185,000
Role: Research Engineer

Agency: US Department of Commerce - National Institute of Standards and Technology
Microsystems for Harsh Environment Testing
Period of Performance: N/A
Total Funding: N/A
Role: Summer Intern

Agency: US Department of Energy, National Energy Technology Laboratory
Geologic Carbon Sequestration Training and Research
Period of Performance: December 2009 - June 2013
Total Funding: \$344,940
Role: Undergraduate Researcher

TECHNICAL SKILLS

Software: MATLAB, R, IGOR, CAD, Pro Engineer, Microsoft Office, Microsoft Excel, Microsoft Access, Microsoft PowerPoint, CNC, EXODUS

Research: Whole air sampling (WAS) of VOCs, Passive diffusive VOC sampling, TO-11A Formaldehyde Sampling, GC-MS, HPLC, Photo-Ionization Detectors, Electrochemical Sensors

Technical/Hardware: Welding (MIG and SMAW), Plasma cutting, Mill, Lathe, Video and camera configuration/installation, Fiber-optic connections, Mechanical repair/maintenance, Visibility sensors (RVR/Transmissometer)

Field Experience: Constructing, installing, and maintaining data collection systems.

TEACHING AND VOLUNTEER EXPERIENCE

Teaching Assistant - University of Colorado Boulder AUG 2018 - PRESENT

- Teaching assistant for undergraduate thermodynamics II course
- Manage grading and office hours for sections of 100+ students

NSF K-12 Teaching Fellow - University of Colorado Boulder JUN 2016 - MAY 2017

- Responsible for planning and implementing engineering curriculum for K-12 students
- Assigned to lead STEM outreach during after school programs for children of low-income communities

- Tasked with reviewing and creating STEM educational curriculum for NSF/CU Boulder co-sponsored website: <https://www.teachengineering.org/>
- Experience working with bilingual students from diverse backgrounds

Teaching Assistant - University of Colorado Boulder

AUG 2015 - MAY 2016

- Assisted in teaching undergraduate Heat Transfer and Materials Science courses
- Held recitation sections/supplemental lectures
- Managed grading for sections of 150+ students

Mentor - NetPals STEM Outreach Program

AUG 2014 - APR 2015

- Provided STEM outreach to Cambridge, MA middle schools
- One-on-one mentorship program with 7th grade science students

CURRICULUM PUBLICATIONS

A. Lamplugh, B. Huang. (2017). University of Colorado and SparkFun© Education. "Do the Robot! Programming a RedBot to Dance." Published by NSF/University of Colorado for TeachEngineering.org. Found at: https://www.teachengineering.org/makerchallenges/view/spfun_dance_maker1

A. Lamplugh, A. Vicksman, M. Zarske, R. Anderson, R. Sullivan, N. Coyle, and M. Vadeen. (2016). University of Colorado. "Discovering Relationships between Side, Length, and Area." Published by NSF/University of Colorado for TeachEngineering.org. Found at: https://www.teachengineering.org/lessons/view/cub_scale_model_lesson01

A. Lamplugh, A. Vicksman, M. Zarske, R. Anderson, R. Sullivan, N. Coyle, and M. Vadeen. (2016). University of Colorado. "Scale Model Project." Published by NSF/University of Colorado for TeachEngineering.org. Found at: https://www.teachengineering.org/activities/view/cub_scale_model_lesson01_activity2

A. Lamplugh, A. Vicksman, M. Zarske, R. Anderson, R. Sullivan, N. Coyle, and M. Vadeen. (2016). University of Colorado. "Build the Biggest Box." Published by NSF/University of Colorado for TeachEngineering.org. Found at: https://www.teachengineering.org/activities/view/cub_scale_model_lesson01_activity1

A. Lamplugh, D. DiLacqua, H. Chu. (2016). University of Colorado and Polytechnic Institute of New York University. "Using Microcontrollers to Model Homeostasis." Published by NSF/University of Colorado for TeachEngineering.org. Found at: https://www.teachengineering.org/activities/view/nyu_homeostasis_activity1